crystal seed along a desired direction according to an orientation including all angles between 0°-90° relative to an engine axial direction to thereby effect a desired percentage change in the natural frequency of the turbine bucket.

6. (Twice Amended) A method of tuning turbine bucket natural frequency comprising:

(a) placing a crystal seed along a desired orientation including all angles between 0°-90° relative to an engine axial direction; and

(b) investment casting the turbine bucket with a single crystal alloy, wherein the desired orientation is selected to tune torsional frequencies without affecting flexure frequencies and to effect a desired percentage change in the turbine bucket natural frequency.

REMARKS

Claims 1-4 and 6-8 are present in this application. By this Amendment, claims 1 and 6 have been amended. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

Claims 1-4 and 6-8 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 4,605,452 to Gemma et al. This rejection is respectfully traversed.

In an interview with the Examiner conducted on July 16, 2002, Applicant's representative discussed distinctions between the invention and the Gemma patent. In particular, Applicant's representative explained that according to the present invention, a crystal seed can be oriented along any angle between 0°-90° relative to an engine axial direction. With reference to the Office Action, however, the Examiner maintains the

rejection over the Gemma patent, providing that "the orientation of the seed is between 0 and 20°," referring to column 3, lines 39-41 and column 12, lines 52-65.

In this context, we believe that the intended claim language has thus been misunderstood. Applicant intends to recite that the orientation of the crystal seed is not simply any angle between 0-90°, thus encompassing the 0-20° disclosed in Gemma, but rather that the seed can be oriented at all angles between 0 and 90°. In contrast, Gemma is limited to orientations between 0 and 20°.

In an effort to clarify this distinction, claims 1 and 6 have been further amended to define a step of placing a crystal seed along a desired direction according to an orientation including all angles between 0°-90° relative to an engine axial direction. Despite the distinctions between the invention and the Gemma patent as discussed in previous responses, Applicant respectfully submits that at least this subject matter, as recognized by the Examiner, is lacking in the Gemma patent. Applicant thus respectfully submits that the rejection is misplaced.

With respect to the dependent claims, Applicant submits that these claims are allowable at least by virtue of their dependency on an allowable independent claim.

Reconsideration and withdrawal of the rejection are respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims are patentable over the art of record and that the application is in condition for allowance. Should the Examiner believe that anything further is desirable in order to place the application in condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Prompt passage to issuance is earnestly solicited.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned **"Version With Markings To Show Changes Made."**

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Twice Amended) A method of manufacturing a turbine bucket comprising:

(a) investment casting the turbine bucket with a single crystal alloy; and

(b) tuning a natural frequency of the turbine bucket without modifying physical features of the turbine bucket, wherein step (b) is practiced by, prior to step (a), placing a crystal seed along a desired direction according to an orientation including all angles between 0°-90° relative to an engine axial direction to thereby effect a desired percentage change in the natural frequency of the turbine bucket.

6. (Twice Amended) A method of tuning turbine bucket natural frequency comprising:

(a) placing a crystal seed along a desired orientation including all angles between 0°-90° relative to an engine axial direction; and

(b) investment casting the turbine bucket with a single crystal alloy, wherein the desired orientation is selected to tune torsional frequencies without affecting flexure frequencies and to effect a desired percentage change in the turbine bucket natural frequency.